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HISTORICAL DEVELOPMENT OF THE NATIONAL TOPOGRAPHIC SYSTEM OF MAP NUMBERING FOR CANADA

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UNIVERSITY OF WATERLOO
OCT 31 1983
GOVERNMENT PUBLICATIONS

TECHNICAL REPORT SERIES

NOVEMBER 1969

Published by:
Surveys and Mapping Branch

CA1 EM 6569H32

a31187 01371920 6b

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available from:

Canada Map Office
Surveys and Mapping Branch
Department of Energy, Mines and Resources
615 Booth Street
Ottawa, Ontario, Canada
K1A 0E9

Catalogue No. SMF-1002E
Price: $1.00

Price subject to change without notice
Ottawa, 1976

HISTORICAL DEVELOPMENT OF THE NATIONAL TOPOGRAPHIC SYSTEM OF MAP NUMBERING FOR CANADA

ABSTRACT

The first organized system of mapping in Canada was developed in 1871. It was based on a land survey system carried out in the Prairie provinces, and was known as the Sectional Map series. A scale of 1 inch equals 3 miles was adopted.

During the next 50 years the main government mapping agencies produced a large number of maps in a variety of scales, and the need for an orderly index system became apparent. In 1923, the National Topographic Series, based on numbered primary quadrangles, was created. Its effectiveness as a national system was limited by the exclusion of Newfoundland and a large portion of northern Canada.

A new index system was devised in 1927, which divided Canada into numbered primary quadrangles, each 4° in latitude by 8° in longitude. The adoption, in 1957, of radical changes in the National Topographic System brought so much opposition from user organizations, that the system was revised again in 1960 to its present format.

INTRODUCTION

Topographic mapping in Canada began in 1843 when Dr. W.E. Logan of the Geological Survey of Canada commenced preparing maps for geological reports. His maps depicted unrelated fragments of Canada such as water courses and lake shores, which were the available routes of travel. Produced in a variety of scales, these early maps never became part of an overall mapping system for the entire country. A period of 50 years was to pass before the first organized system of mapping Canadian territory would be instituted.

In 1870 the vast Hudson Bay Company territories were purchased by the Canadian government and the agrarian population movement into the prairies began. This interest in the west stimulated a system of land development which resulted in the surveying of townships and the production of plans based on a scale of one inch equals 40 chains. The township plans developed into a map series known as Sectional Maps which covered most of the developed areas of the three prairie provinces on a scale of one inch equals three miles.

Further surges of prairie settlement and transcontinental railway construction during the early 1900's increased the work of the survey crews and the Sectional Map system extended its coverage from a southern limit of the 49th parallel to the western limit of the 141st meridian. Figure 1 shows the plan and numbering system of the Sectional Map series for the year 1912.

NEED FOR A NATIONAL INDEXING SYSTEM

By 1913 several different types of maps had been produced with various scales and numerical indexes of their own. Maps published at this time included a Geological Survey series, Militia and Defence plans, a Chief Geographer's series, and some 90 maps of the Sectional Map series. As the diversities of map scale and indexing increased, it became essential that the mapping of Canada should be coordinated into an orderly system suitable for series maps of different scales and for coverage of the whole nation. Such a system was envisaged in 1923, by the Board of Topographical Surveys and Maps (Order of Council P.C. 540) with the introduction of the National Topographic Series.

THE FIRST NATIONAL TOPOGRAPHIC SYSTEM

The first indexing of the National Topographic Series was based on the numbering of primary quadrangles corresponding to the *Carte du Monde* (International Map of the World) at a scale of one to one million. Figure 2 shows the national plan and numbering system as determined in 1925 by the Board of Topographical Surveys and Maps. Numbering of the primary quadrangles is increased consecutively by one in the East to West direction, and by 20 in the South to North direction. The National Topographic Series had the advantage of incorporating three scales in its primary quadrangle subdivisions (a one inch to one mile, to two miles and to four miles), however, it did not provide complete national coverage because Newfoundland and a large portion of northern Canada were not included. Figure 3 shows details of the dimensions and subdivisions of the primary quadrangle number 68 of Figure 2.

The following four maps were published in accordance with the numbering of the first national topographical system:

Lac Seul 47 – PO (now 52K)
Pointe du Bois 47 – RQ (now 52L)
Carroll Lake 47 – XW (now 52M)
Kamloops 52 – MV (now 92I/9)

INCLUSION OF WIDER RANGE OF SCALES

The number of different scales in the National Topographic Map Series increased to five, and in 1927 a new index system, based on the pattern used by India and Pakistan was devised. This indexing system is shown in Figure 4. Under the system, Canada was divided into numbered primary quadrangles each 4° latitude by 8° longitude. The identification of each series

was based on the portion of a primary quadrangle which it represented. Figure 5 shows the complete primary quadrangle denoting a map of the 16 mile series and the associated tabulated information explains the relationship of other scales to their portion of the primary quadrangle.

This system fulfilled the immediate map indexing requirements, but did not provide complete coverage of Canada. It is interesting to note that the system of subdivision was the same as that adopted for dividing a section of land into quarter quarter-sections as specified under Section 54, of the Dominion Lands Surveys Act.

SCALE CONVERSION

In 1948, an agreement was entered into by the military mapping agencies of Canada, the United States and Great Britain on the matter of standardization of map scales for purposes of defence. Canada agreed to produce maps at scales of 1:50 000 and 1:250 000. There were in 1952 about 850 standard series maps (1 inch equals 1 mile) which had to be converted to a scale of 1:50 000 for military use. Since Canada could not afford to maintain this series in two different scales, the new scale system had to be adopted. All map series are now being produced at the new fractional scales i.e.; 1:1 000 000, 1:500 000, 1:250 000, 1:125 000, 1:50 000 and 1:25 000.

A production problem arose with the slightly larger 1:50 000 scale maps which could not be printed as a single sheet because North Atlantic Treaty Organization regulations limited the size of the paper. This situation created an adverse affect on the 1:50 000 mapping program as each map had to be published in the form of separate east and west half sheets. In 1968 the problem was resolved by a change in federal policy which permitted the joining of the halves to form complete map sheets.

EXTENSION OF SYSTEM NORTH OF 60° LATITUDE

In 1955 the Army Survey Establishment and the Surveys and Mapping Branch discussed the completion of the National Topographical System for Canada. As a result, the system was revised in 1957 under the terms of a joint decision made by W.H. Miller, Director of the Surveys and Mapping Branch and C.H. Smith, Director of Military Surveys, such that the subdivisions of the fundamental area unit, the primary quadrangle, varied with increasing latitude. The primary quadrangles south of latitude 80° were maintained at 4° latitude by 8° longitude, whereas, north of latitude 80° the primary quadrangles were increased to 4° latitude by 16° longitude. Figure 6 shows the 1957 National Topographic System indexing for the whole of Canada. Figure 7 illustrates the primary quadrangle breakdown for different values of latitude, and the associated tabulated information explains the index numbering and scale relationships.

This revision constituted a radical change in the indexing of the National Topographic System. It necessitated the conversion of 200 maps to new sheet lines and in many instances, during the changeover period, indexing problems occurred because two maps could have identical numbers yet cover different geographical areas.

User-opposition, to the 1957 revision, particularly that of government agencies, was so intense that a further revision to the system became necessary. This revision came into affect in 1960 following a meeting of representatives of various branches of the Department of Mines and Technical Surveys and the Army Survey Establishment such that the change was limited to the secondary numbering of quadrangles north of 60°. Each secondary quadrangle became one sixteenth of a primary quadrangle and each secondary quadrangle width became multiples of fifteen minutes of longitude.

Adoption of these changes meant that some three hundred 1:50 000 series maps were incorrect; they had to be revised. The 1960 plan of the National Topographic System is shown in detail in Figure 8. The primary quadrangle subdivisions are shown in detail in Figure 9.

As in the 1957 revision, the 1960 revision changeover period produced a temporary duplication of some map numbering. However, the change was completed by 1965 and on that date duplications of numbers were removed from the National Topographic System.

CONCLUSION

The present National Topographic System of map numbering has evolved over a period of almost one hundred years.

Changes which occurred in the indexing format were caused by government and private businesses spreading their interests over a great geographical area, and demanding a wider range of map scale presentations. Canadian participation in international defence organizations also led to changes in index numbering.

Stimulated by growth and change the present system has developed into a complete coverage of Canada that is capable of accommodating all of the map series.

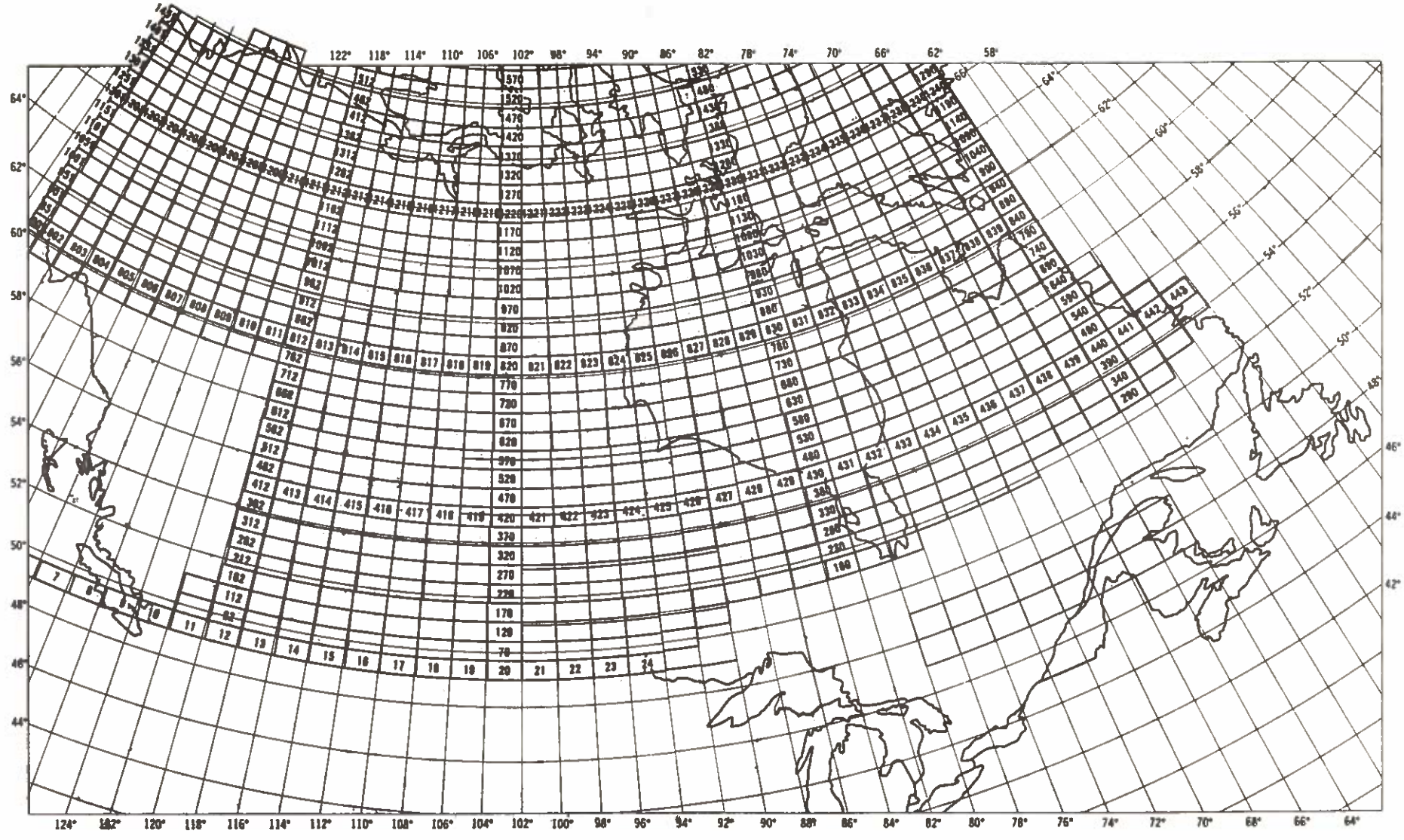


Figure 1

Index to Map Sheets Topographical Survey of Canada 1912

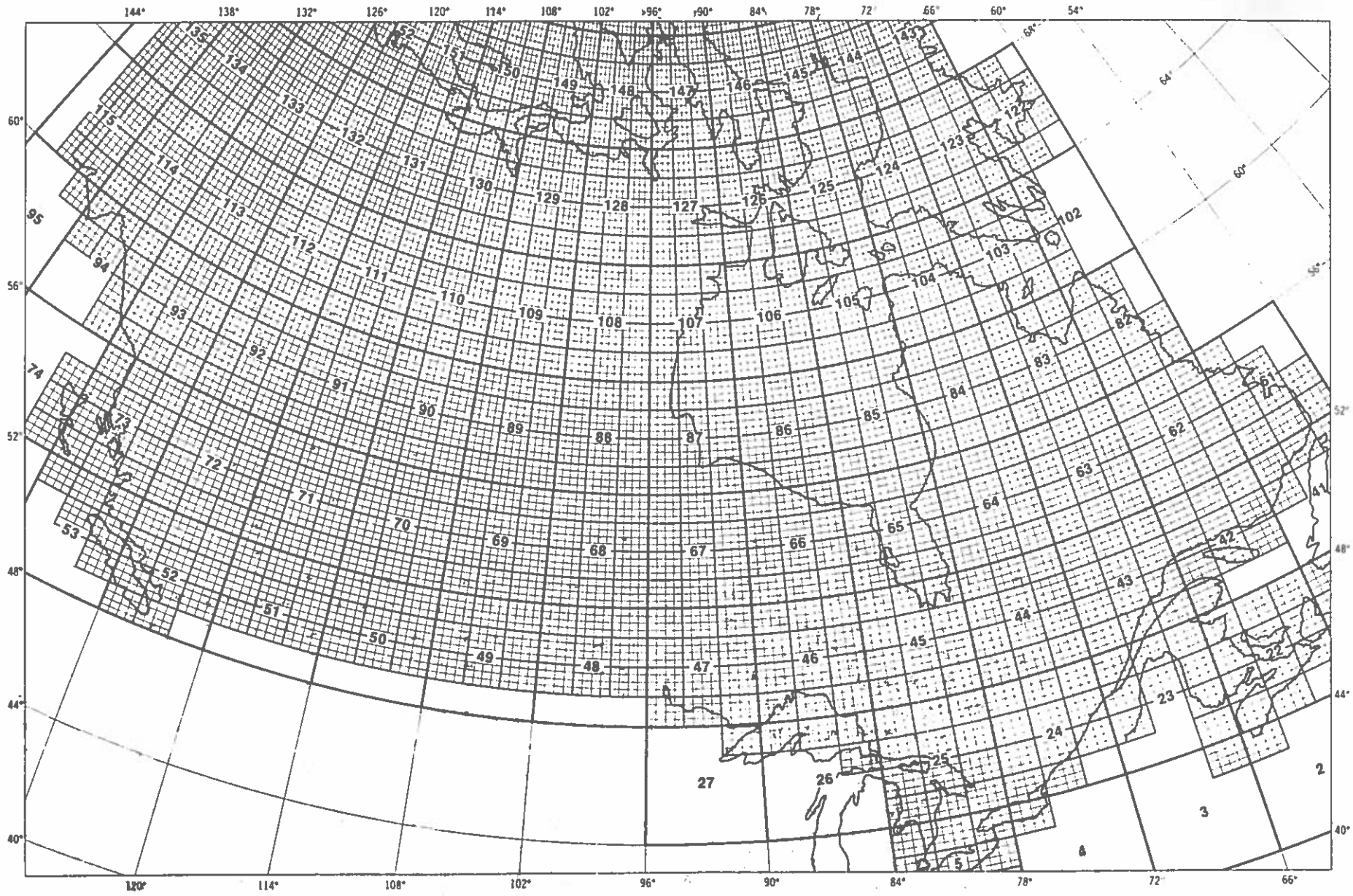


Figure 2

Index to Map Sheets **Topographical** Survey of Canada 1925

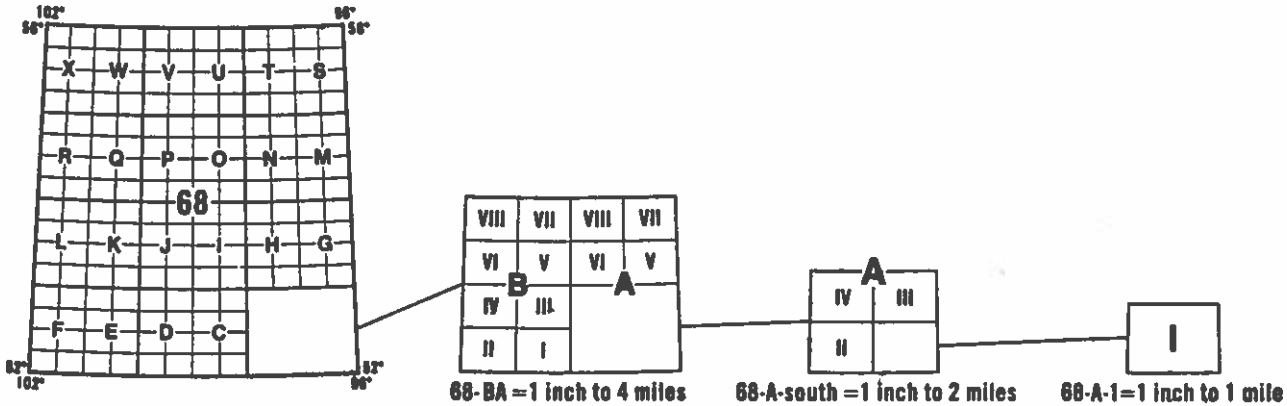


Figure 3

Primary Quadrangle No. 68 of 1925 National Topographic System

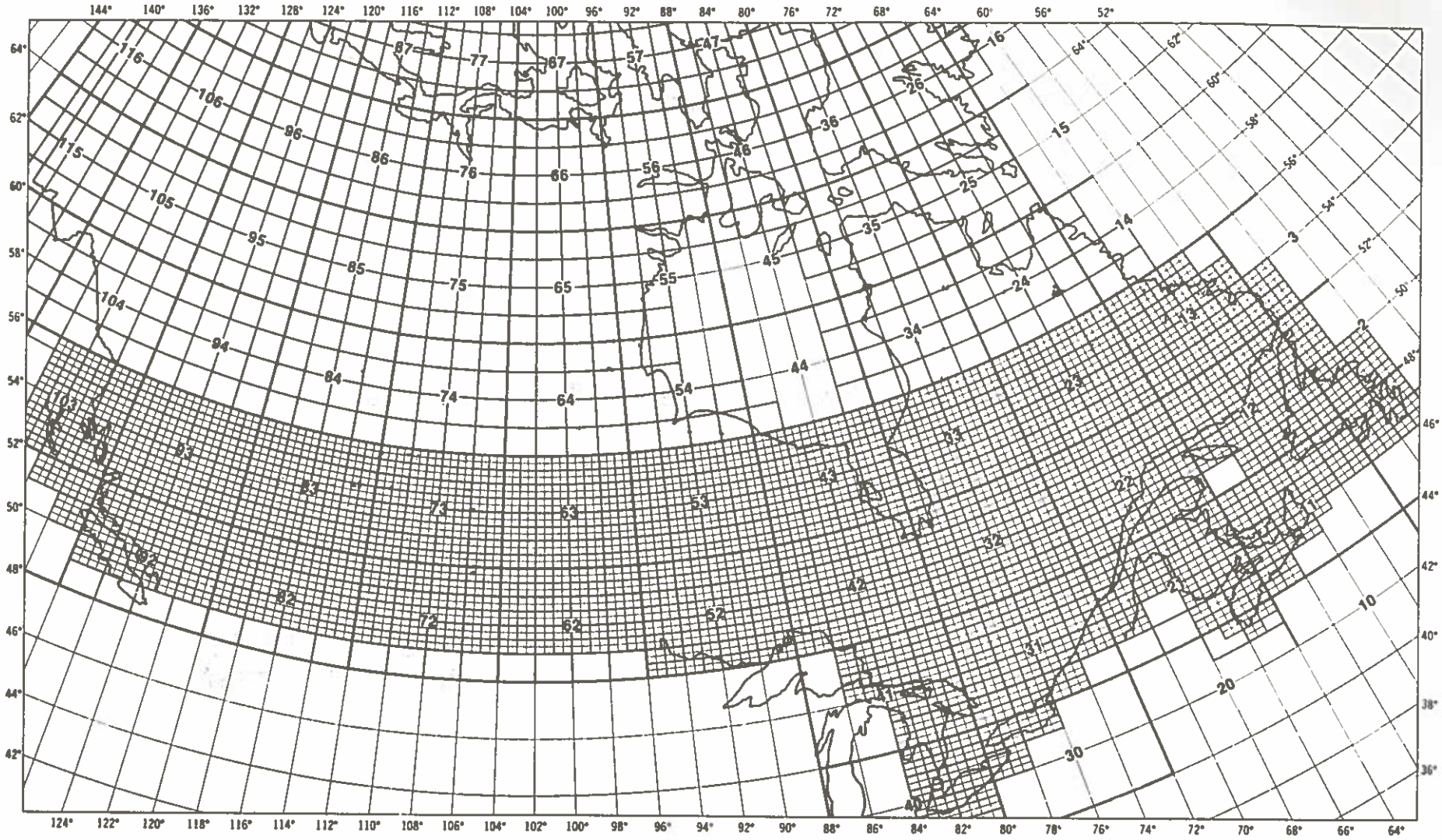
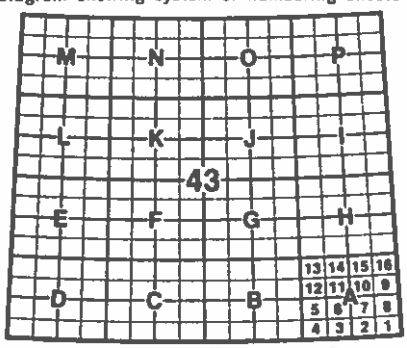


Figure 4

Index to Map Sheets Topographical Survey of Canada 1927

Diagram showing system of numbering sheets



Every numbered unit in the main index
is subdivided the same as **43**

SYSTEM OF NUMBERING SHEETS

The basis of the index is a unit, integral parts of which comprise a complete map sheet of the Carte du Monde au Millionième. The unit consists of sheets 4° in latitude by 8° in longitude on the scale of sixteen miles to one inch whose numbers are shown on the index thus **43**

EIGHT-MILE SHEETS: Each sixteen mile sheet is quartered into sheets of scale eight miles to one inch named respectively N.W., N.E., S.W., S.E.; the number taking the form thus .....**43 N.W.**

FOUR-MILE SHEETS: Each sixteen mile sheet is divided into sixteen sheets of scale of four miles to one inch lettered regularly from A to P as shown on the diagram, the number taking the form thus .....**43 G**

TWO-MILE SHEETS: Each four mile sheet is quartered into sheets of scale two miles to one inch named respectively N.W., N.E., S.W., S.E.; The number taking the form thus .....**43 A/N.W.**

ONE-MILE SHEETS: Each four mile sheet is divided into sixteen sheets of scale one mile to one inch numbered from 1 to 16 as shown on the index, the number taking the form thus **43 A/7**

Every sheet will also be given a name indicating its location by reference to the largest city or town in it, or by reference to some well known geographical feature.

Figure 5

National Topographic System
1927 Indexing Plan

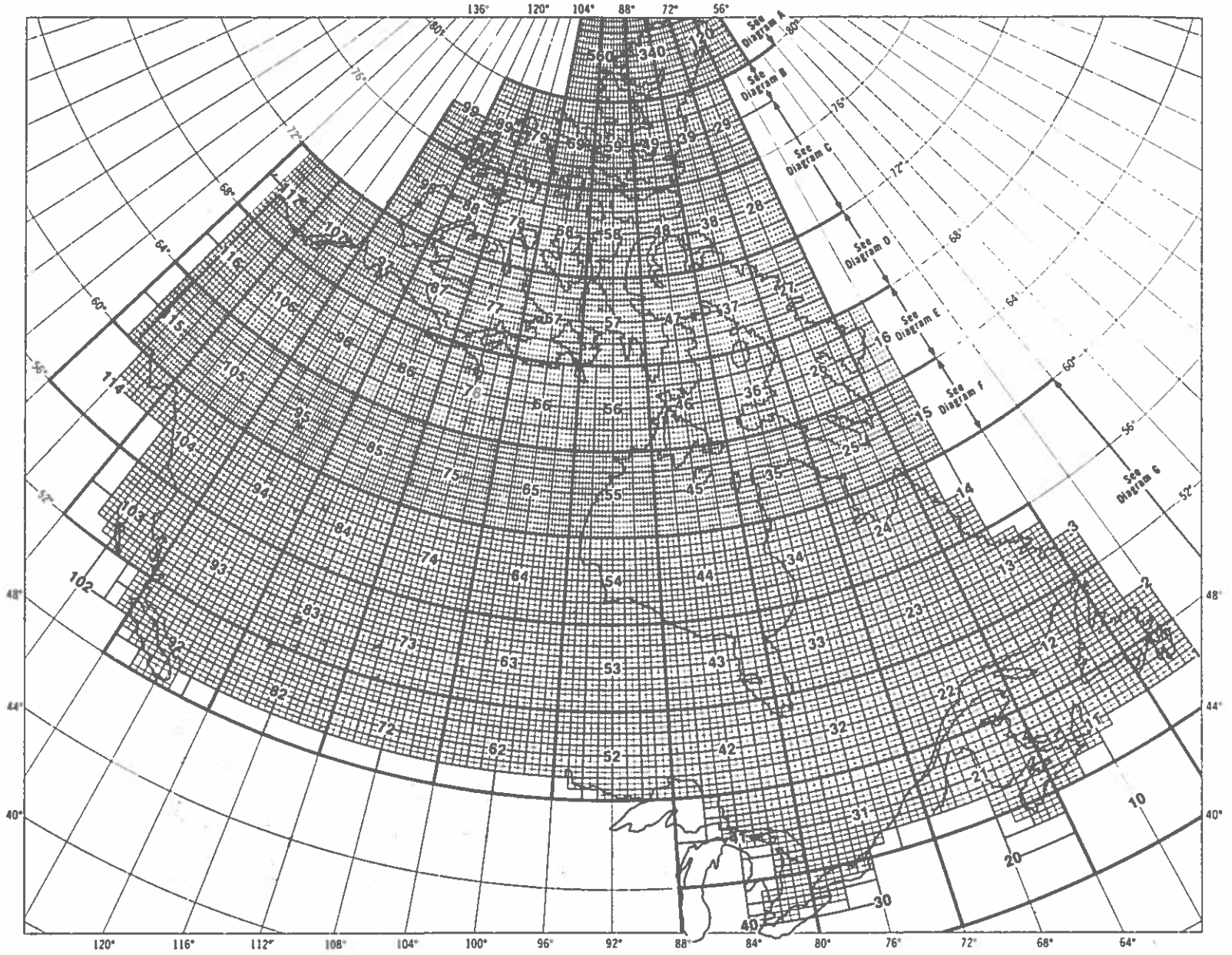


Figure 6

Index to Map Sheets Topographical Survey of Canada 1957

The National Topographic system consists of the following series:

1:1,000,000
1:500,000 (and 1 inch = 8 miles)
1:250,000 (and 1 inch = 4 miles)
1:126,720 (or 1 inch = 2 miles)
1:50,000 (and 1 inch = 1 mile)
1:25,000 (where required)

Under the system, Canada is divided into numbered primary quadrangles, each 4° latitude by 8° longitude (16° longitude north of 80°). Sheet lines and identification for each series are based on the subdivision of each primary quadrangle as follows.

34
a primary quadrangle - denotes a sheet of the 1:1,000,000 series.

34 S.W.
a quarter of a primary quadrangle - denotes a sheet of the 1:500,000 (or 8 mile) series

34 A
a lettered quadrangle - denotes a sheet of the 1:250,000 (or 4 mile) series. South of 68° sheets are one sixteenth of a primary quadrangle and lettered A to P. North of 68° sheets are one eighth of a primary quadrangle and lettered A to H.

34 A/N.E.
a quarter of lettered quadrangle - denotes a sheet of the 1:126,720 (2 mile) series.

34 A/1
denotes a sheet of the 1:50,000 (or 1 mile) series. South of 60° sheets are one sixteenth of a lettered quadrangle, numbered 1-16, and published in two halves (East and West) North of 60° lettered quadrangles are subdivided into 16, 24 or 32 sheets of the 1:50,000 series, depending on latitude For details see diagrams.

34 A/1 b
denotes a sheet of the 1:25,000 series which is 1/8th the area of a 1:50,000 sheet south of 60°, and 1/4 the area north of 60° and is identified by a lower case letter suffix. For details see diagrams G and F.

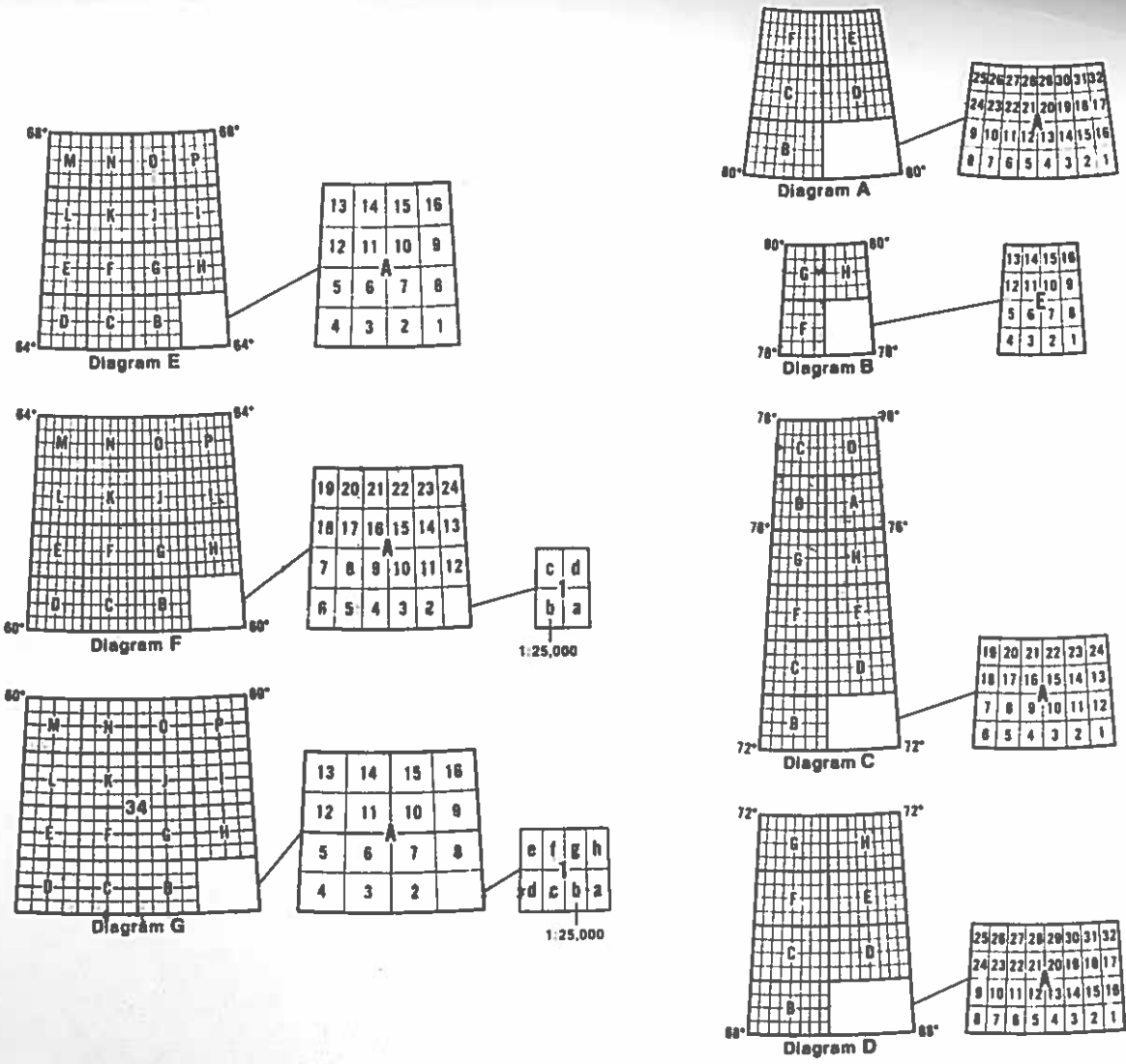


Figure 7

Indexing Plan National Topographic System (Revised 1957)

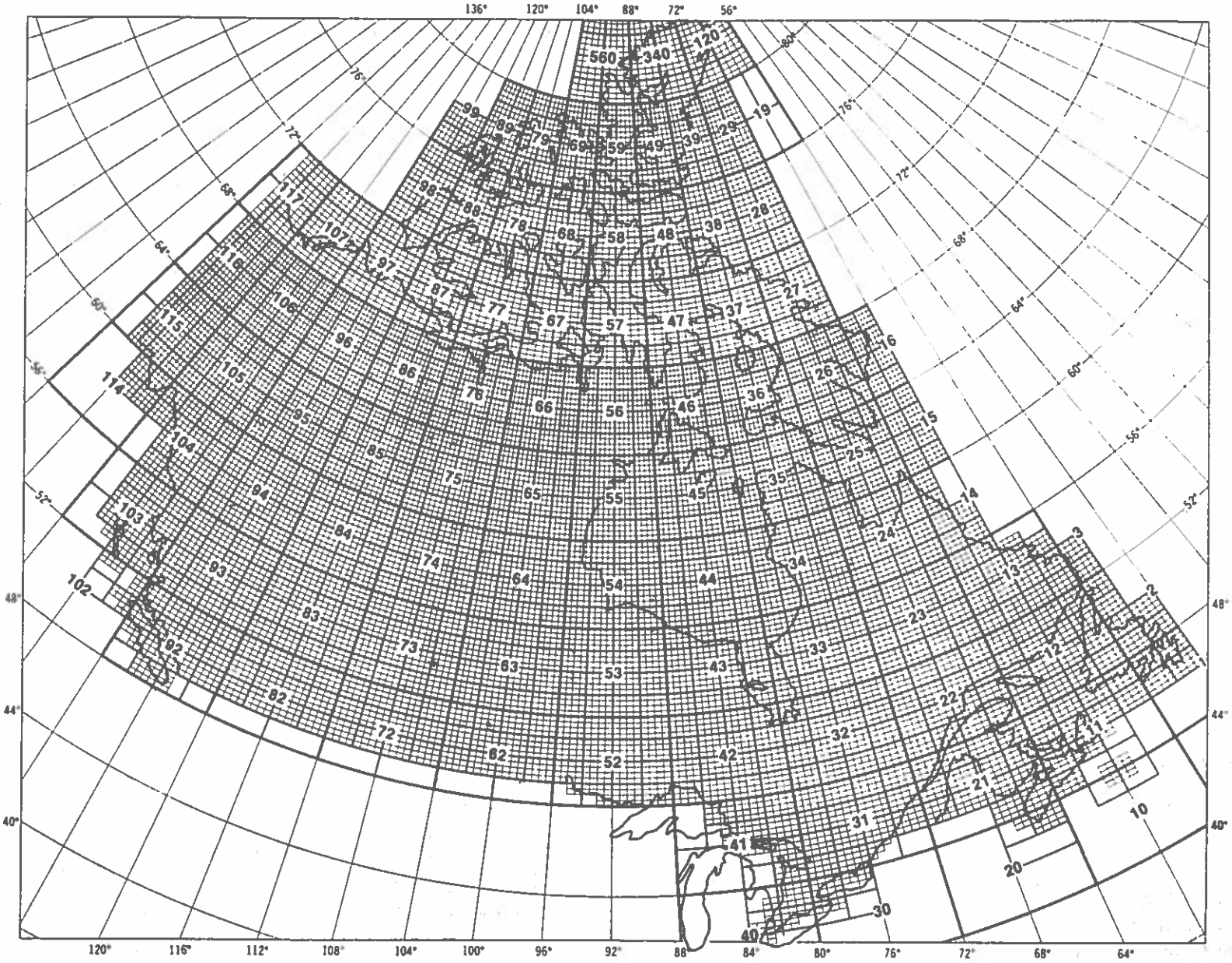


Figure 8

Index to Map Sheets Topographical Survey of Canada 1960

The National Topographic System consists of the following series:

1:1,000,000
1:500,000 (and 1 inch = 8 miles)
1:250,000 (and 1 inch = 4 miles)
1:125,000 (and 1 inch = 2 miles)
1:50,000 (and 1 inch = 1 mile)
1:25,000 (where required)

Under the system, Canada is divided into numbered primary quadrangles, each 4° latitude by 8° longitude (16° longitude north of 80°). Map sheet lines and identification for each series are based on the subdivision of each primary quadrangle as follows:

54
a primary quadrangle - denotes a map of the 1.1,000,000 series.

54 S.W.
a quarter of a primary quadrangle - denotes a map of the 1:500,000 (or 8 mile) series.

54 A
a lettered quadrangle - denotes a map of the 1:250,000 (or 4 mile) series. South of 68° maps are one sixteenth of a primary quadrangle and lettered A to P. North of 68° maps are one eighth of a primary quadrangle and lettered A to H.

54 A/N.E.
a quarter of a lettered quadrangle - denotes a map of the 1:125,000 (or 2 mile) series.

54 A/2
a sixteenth of a lettered quadrangle - denotes a map of the 1:50,000 (or 1 mile) series. For details see diagrams.

54 A/2b
denotes a map of the 1:25,000 series which is 1/8th the area of a 1:50,000 map and is identified by a lower case letter suffix. For details see diagram.

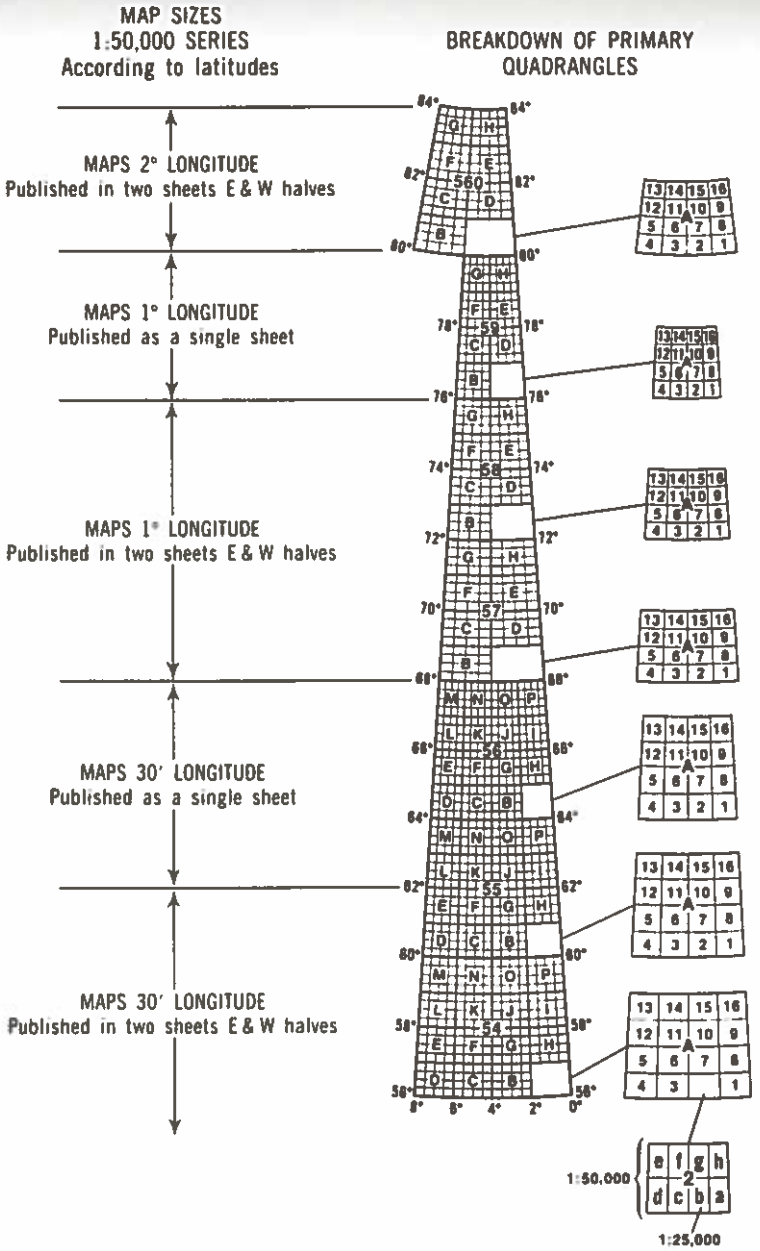


Figure 9

Indexing Plan National Topographic System (Revised) 1960